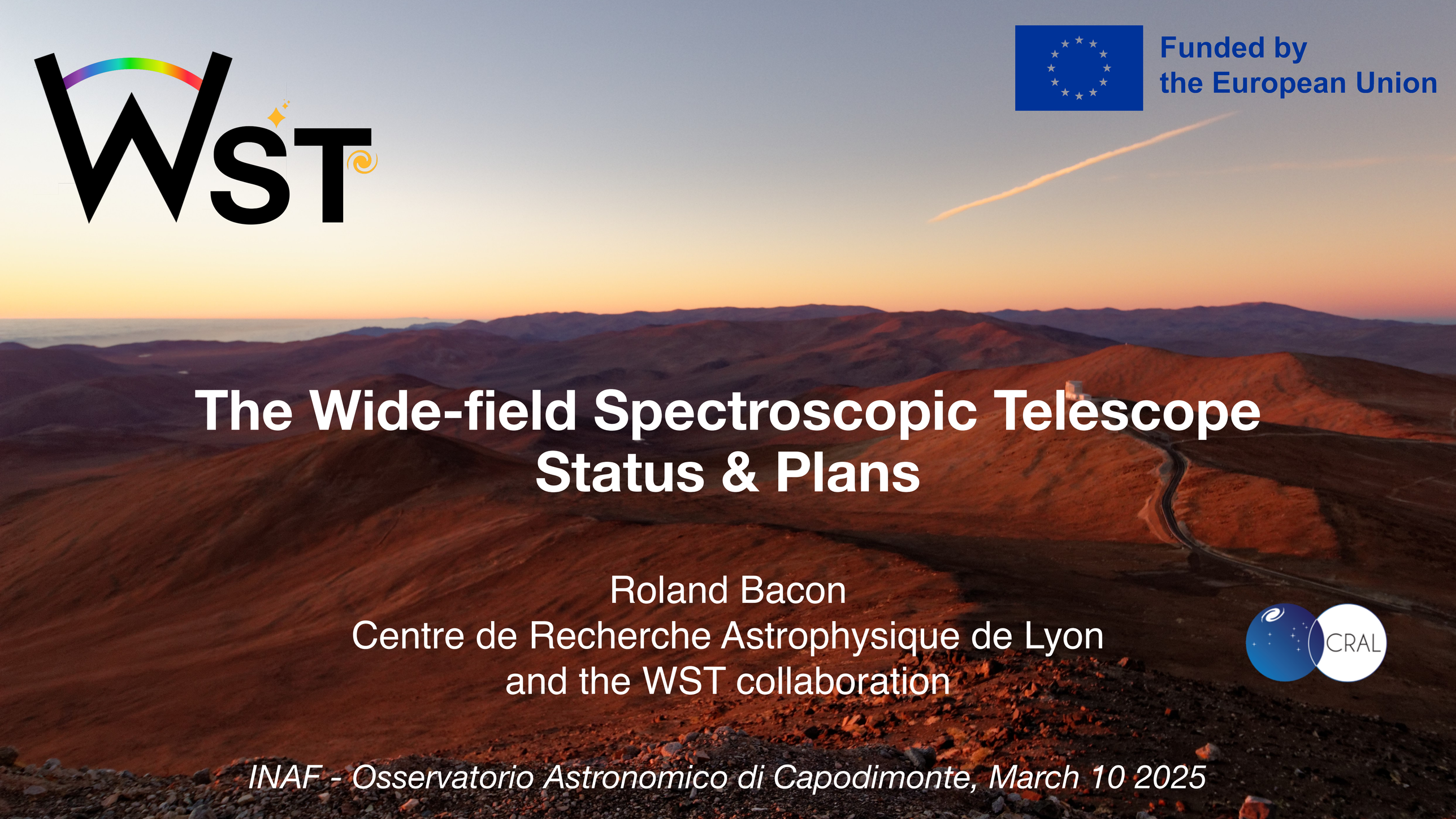


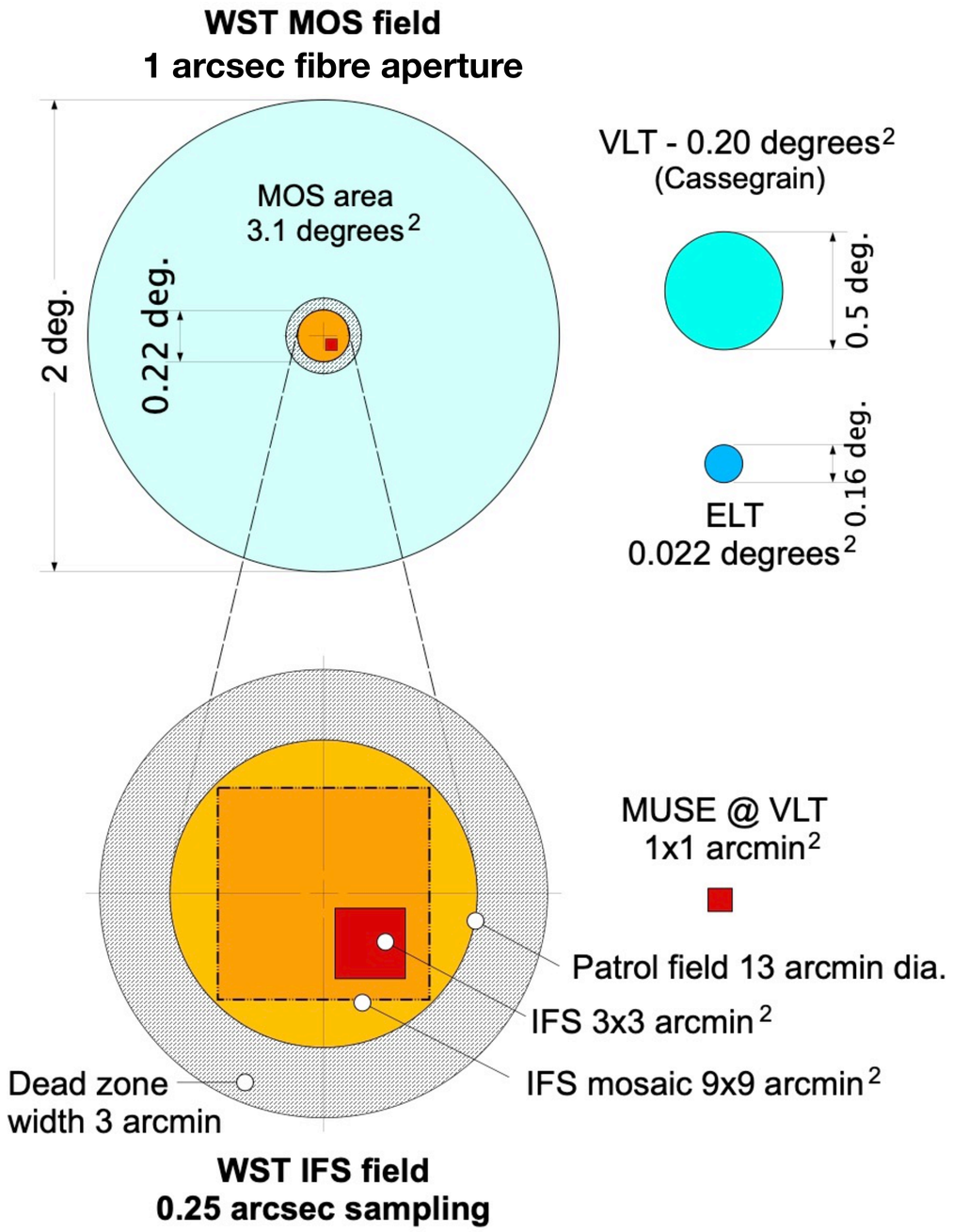
Funded by
the European Union

The Wide-field Spectroscopic Telescope
Status & Plans

Roland Bacon
Centre de Recherche Astrophysique de Lyon
and the WST collaboration

INAF - Osservatorio Astronomico di Capodimonte, March 10 2025

Top Level Requirements



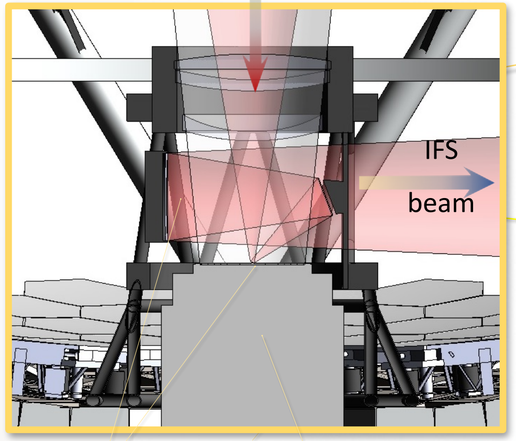
Telescope Aperture	12 m, seeing limited
Telescope FoV	3.1 deg²
Tel. Spec Range	0.35-1.6 µm
MOS LR Multiplex	20,000
MOS LR Resolution	3,000-4,000
MOS LR Spec Range	370-970 nm (simultaneous)
MOS HR Multiplex	2,000
MOS HR Resolution	40,000
MOS HR Spec Range	350-970 nm (3-4 regions)
IFS FoV	3x3 arcmin²
IFS Resolution	3,500
IFS Spec Range	370-970 nm (simultaneous)
IFS Mosaic	9x9 arcmin²
MOS & IFS parallel operation	
ToO implemented at telescope and fibre level	

Top Level Requirements

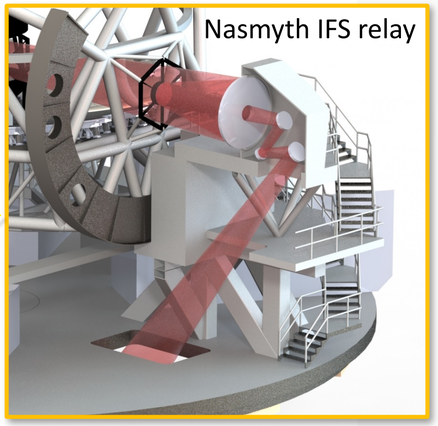
Upgrade Plan

- An IR (1-1.6 μm) extension of the MOS-LR
- A MOS mini-IFUs
- A GLAO for the IFS

MOS & IFS beams



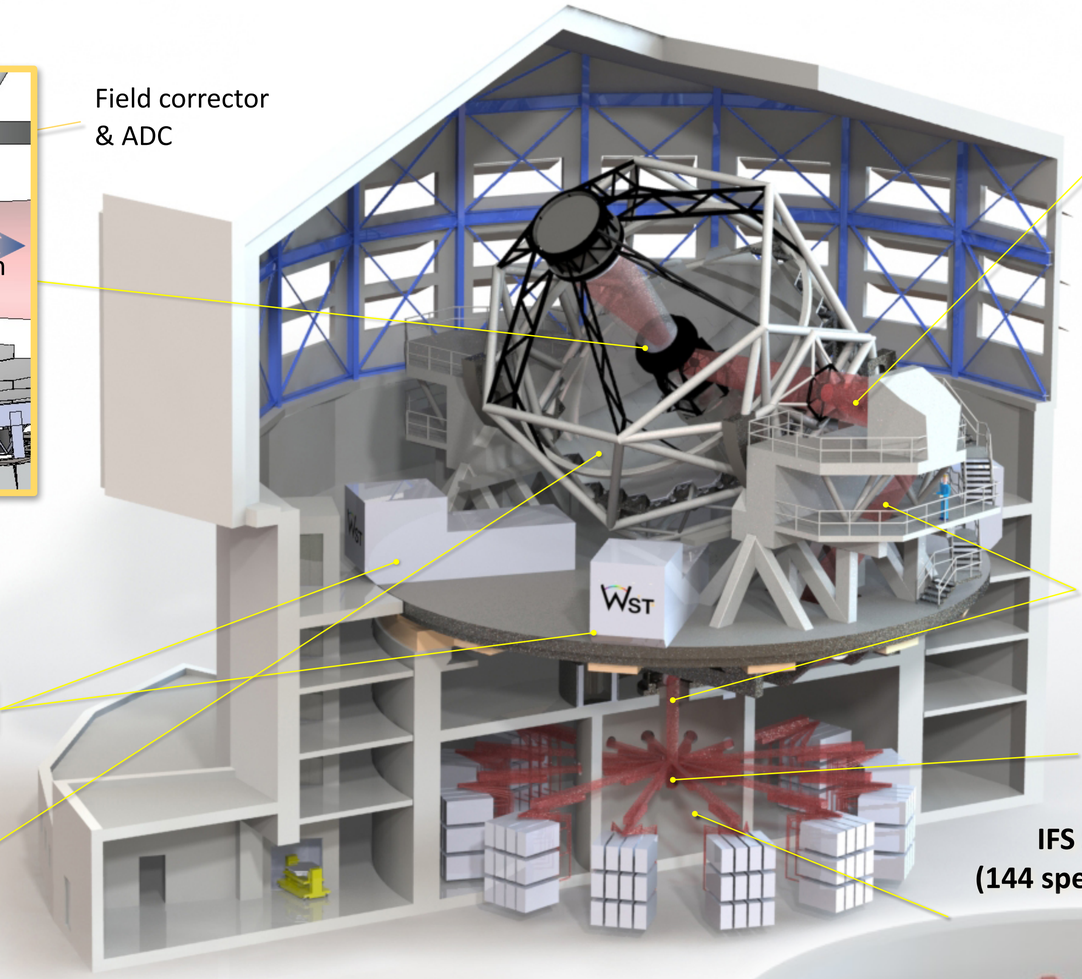
Field corrector & ADC



IFS Cassegrain pick-up & relay mirrors

MOS f/3 focus & positioner

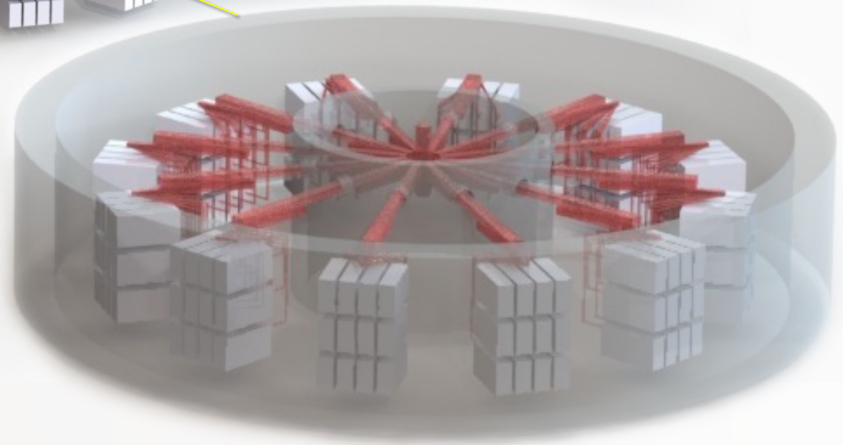
MOS instruments

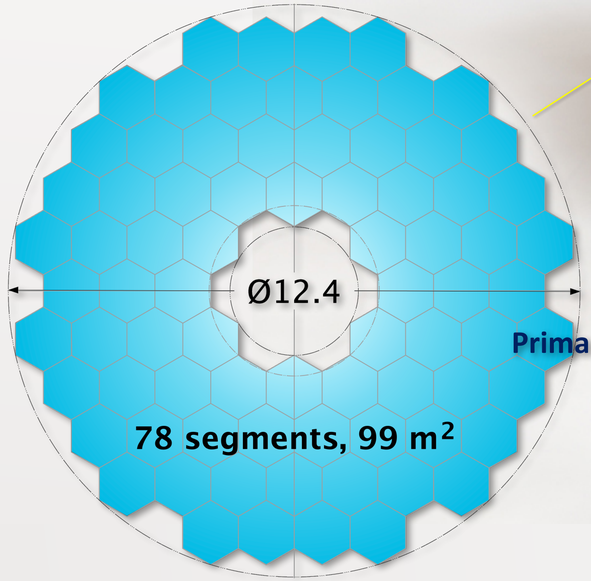


IFS coudé beam & optical de-rotator

IFS f/35 focus

IFS Station (144 spectrographs)

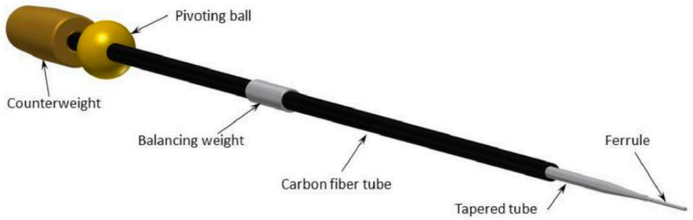




Primary mirror

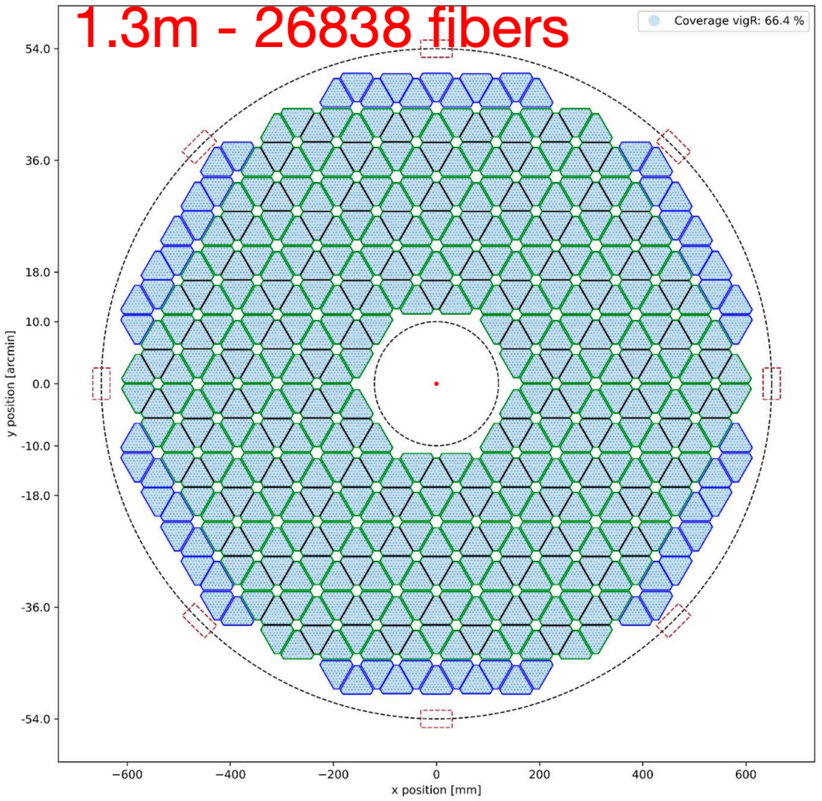
Innovative instrument designs
Concepts for the MOS positionner

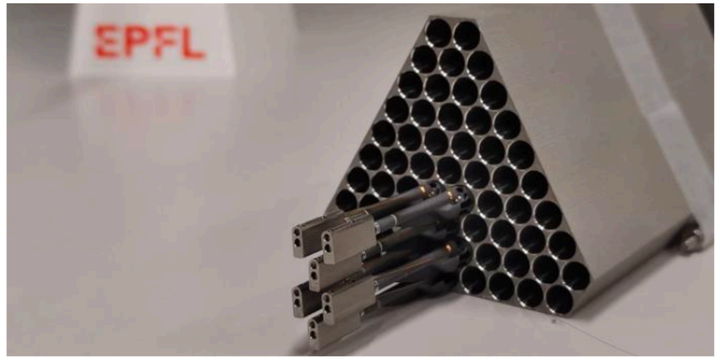
https://doi.org/10.1117/12.3017



Tilting spines (Echidna, 4MOST)

FLEX design (AIP)

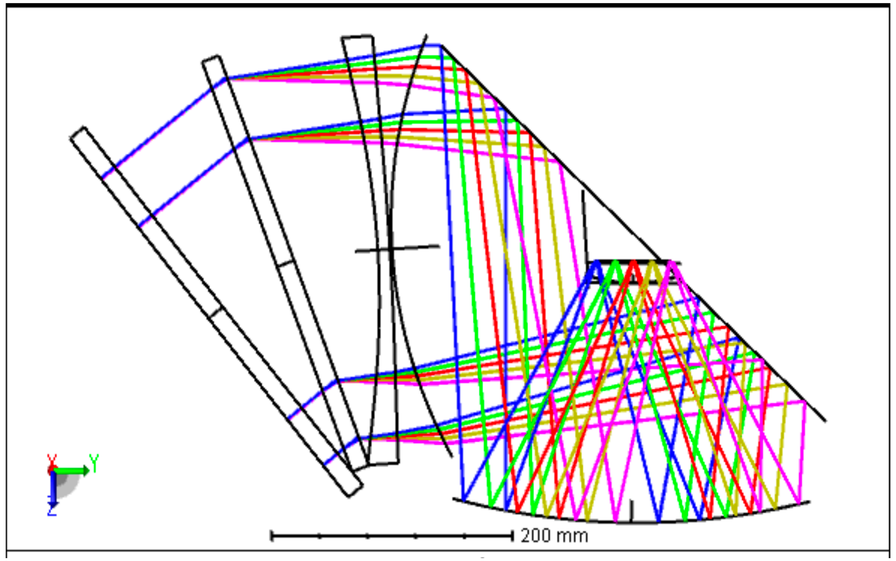




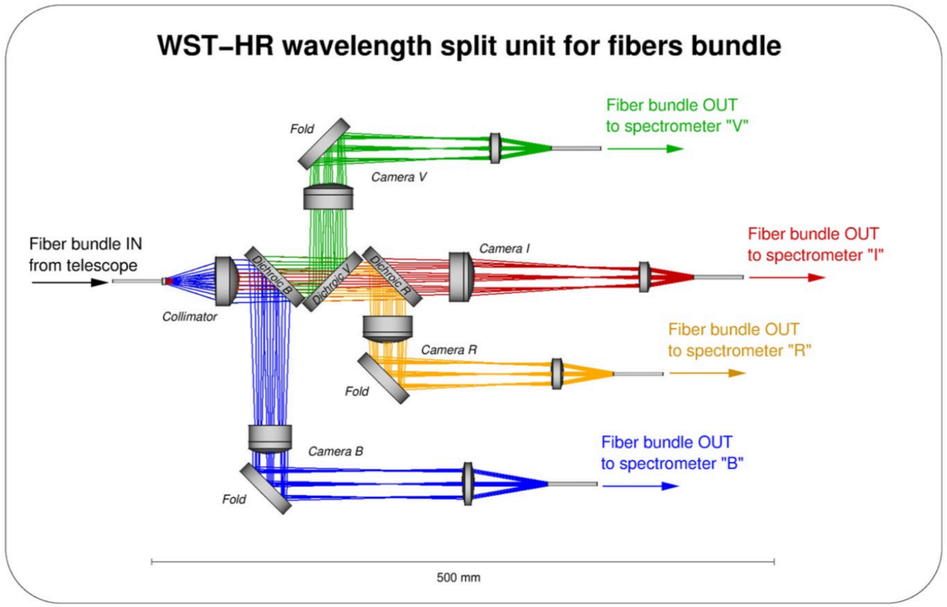
Theta-Phi positioners modules (EPFL)

R-theta flexible positioner (UKATC)

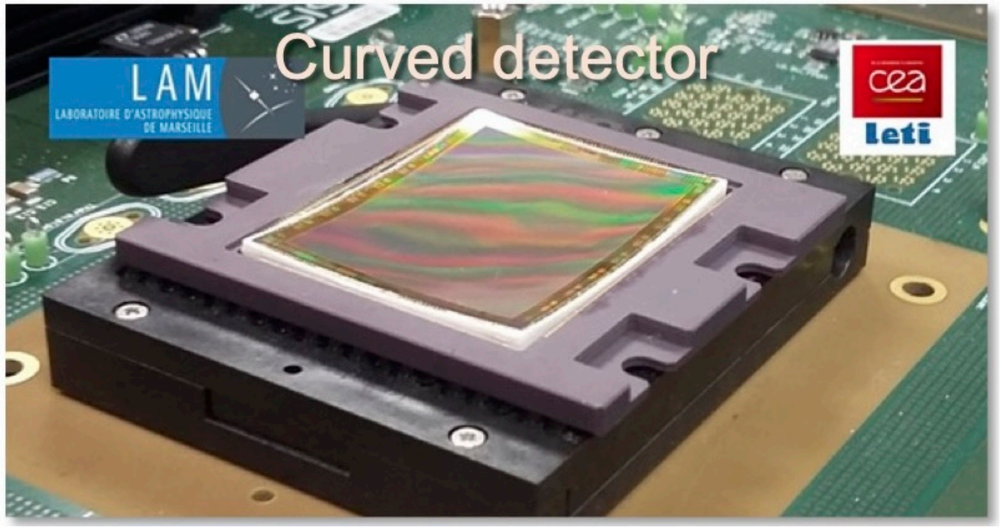
Innovative instrument designs
Spectrograph optical designs



Folded solid schmidt spectrograph design (Sauders W)

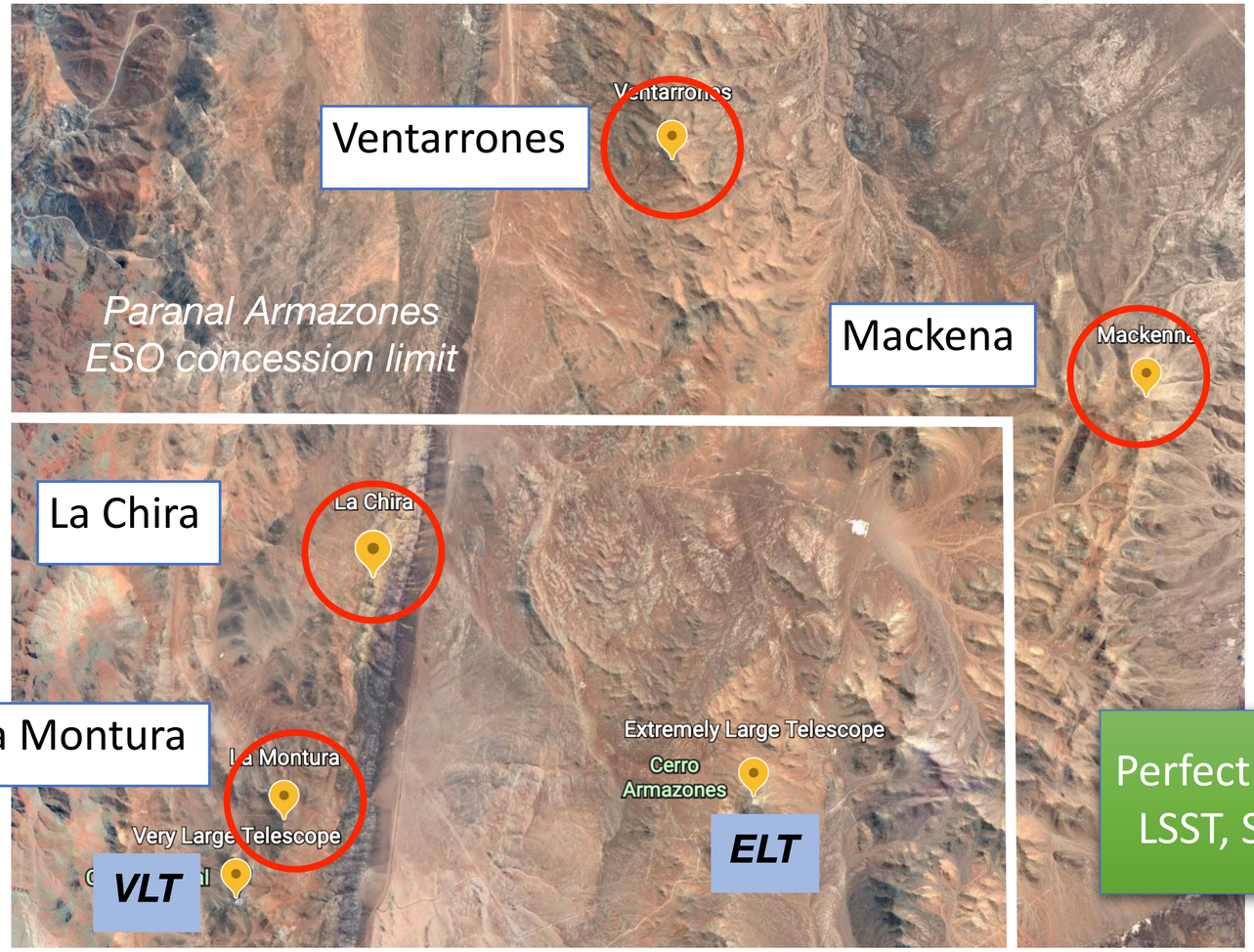


Wavelength split unit for the fiber bundle HR spectrograph (Barden S)



Curved CMOS (LAM)

Potential sites in ESO areas



Potential sites in and around Paranal-Armazones ESO area

Angel Otarola (ESO)

Sustainability

Paranal solar plant - 9 MW (Filippi et al, 2022)

Perfect match to LSST, SKA, CTA

1700 t of CO2 equivalent

Sustainability

Efficient cooling system for ~400 detectors

DESI cryostats (CEA)

On-site computing facilities powered by solar plants

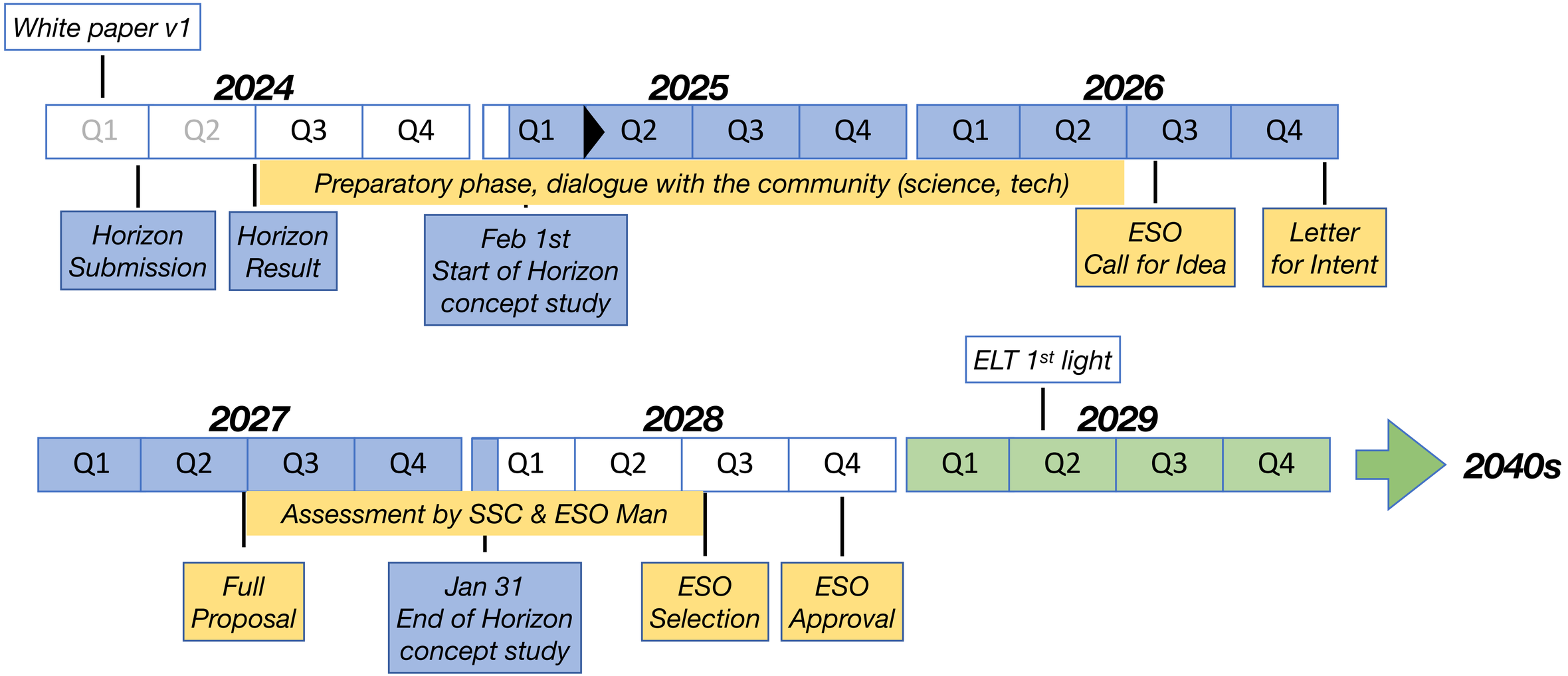
In the first 5 years of operation, WST will provide:

- MOS LR
  - **250 million** galaxies (to AB 24.5) over **14,000 deg²**
  - **25 million** stars (to AB 23.0) over the **entire galaxy and local group**
- MOS HR
  - **A few million** stars (to AB 17.0) over most of the galaxy
- IFS
  - **4 billion** spectra over 30 deg² in diverse environments (low-density fields, galaxy and stars clusters, galactic fields …)

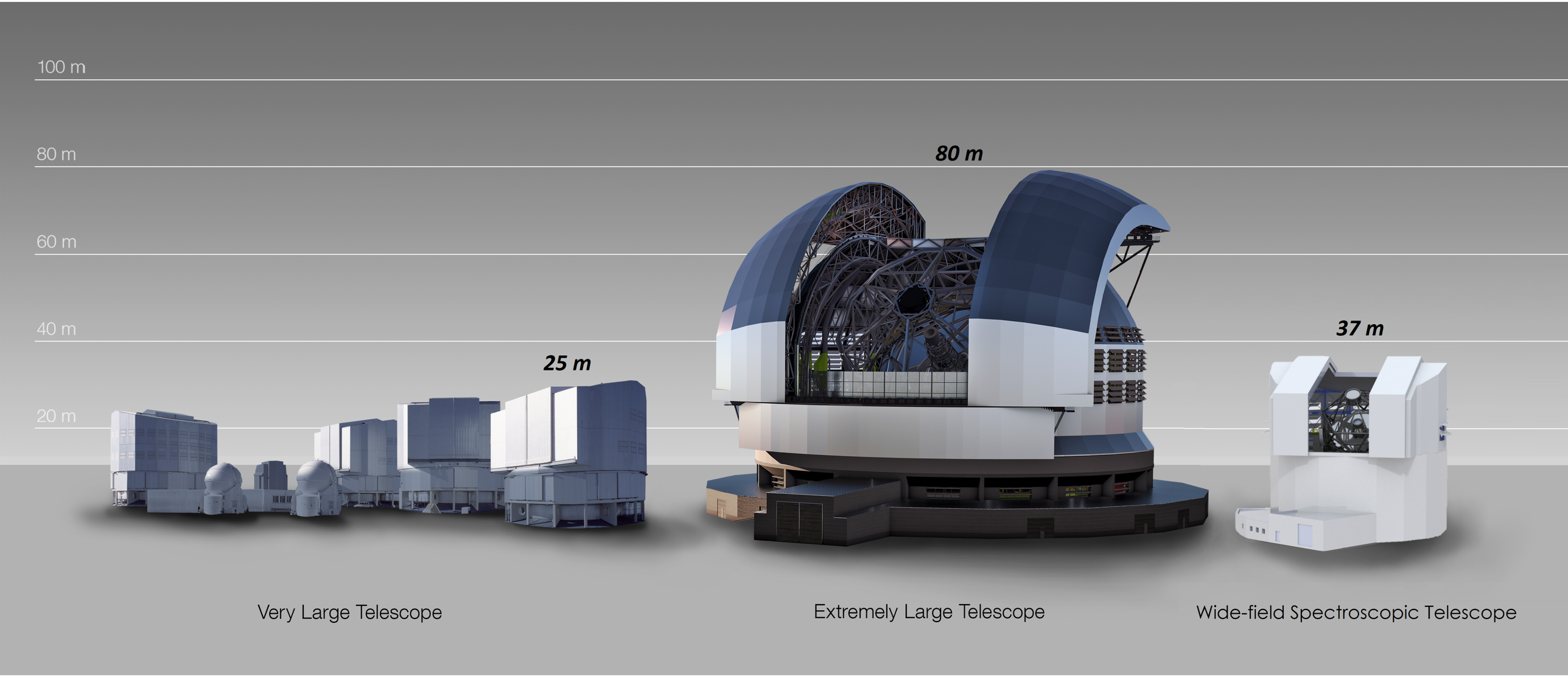
Operation challenges

- Advanced fully automated data reduction and analysis
- Running multiple surveys in parallel
- Enabling time-domain science
- Running surveys to completion while addressing new emerging scientific cases

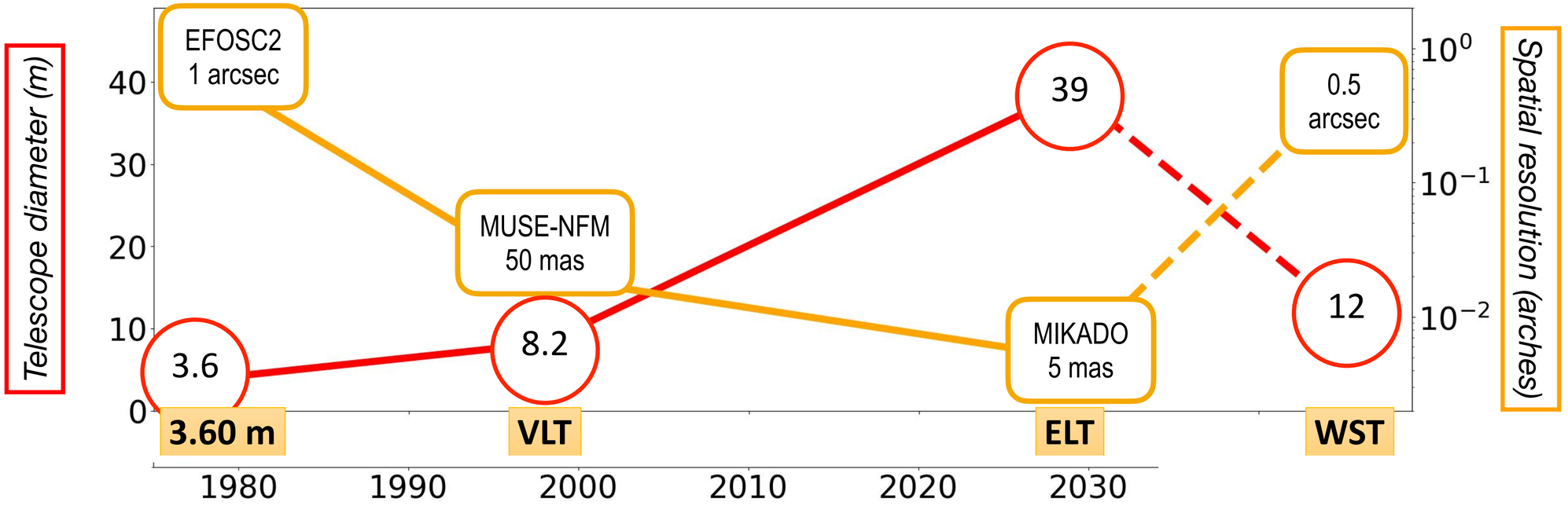
WST overall schedule



WST in the Paranal-Armazones ESO context



The evolution of ESO flagship telescopes



ESO future plans

With **Expanding Horizons**, ESO will search for its next innovative ground-based programme. We aim to identify the next **transformational facility** that will advance humanity's understanding of the Universe whilst fostering international collaboration. ESO will accept proposals from the entire astronomical community.

Thank you